



# The Prevalence of Hip and Groin Injuries in Football Players

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**Abstract:** This study was undertaken to find the prevalence of hip and groin injuries in football players using the HAGOS questionnaire in association with the flexibility and the agility of the player. To check the prevalence HAGOS questionnaire was used, for flexibility the Sit and Reach test and for agility the Illinois Agility test. The variable factors of the study were the age of the player, the hours and years of practice and the level of sports. The results of the study show that there was prevalence of hip and groin injuries also a significant co-relation was found between HAGOS and flexibility and HAGOS and agility.

**Index Terms - HAGOS, Sit and Reach test, Illinois Agility test, Hip and Groin injuries, Football.**

## I. INTRODUCTION

Football in India recently has gained good recognition<sup>[1]</sup> and has become a household sport being played professionally as well as for recreation by both males and females. Most common complaints of athletes of all sports and all ages have been hip and groin pain.<sup>[2]</sup> The hip joint isn't a superficial joint and has a complex anatomy making it difficult to examine.<sup>[3]</sup> Football is a sport that requires; rapid change of direction, kicking action<sup>[3]</sup>, strength, agility, speed, power, balance and endurance.<sup>[4]</sup> Hip and groin problem risk factors are prevalent in footballers which can double their chances of new injuries.

Definition of Injury: The Injury Consensus Group of federation Internationale de Football Association (FIFA) (2006), defined an injury as "any physical complaint sustained by a player that results from a football match or football training, irrespective of the need for medical attention or time loss from football activities."<sup>[5]</sup>

Football is a sport that necessitates quick body movement, which is dictated by factors such as the other team's player with and without the ball, ball movement, and teammate movement. Fast movements, which become prominent in short and lengthy sprints, explosive reflexes (jump), and quick changes of direction define the current football game for these reasons. High-speed activities, which may be classified as acts demanding maximum speed, acceleration, or agility, are known to have an influence on football performance. Football is a high-intensity, intermittent, non-contiguous activity, according to physiology. Musculoskeletal injuries account for around a quarter of all football injuries, with the hip (17%) and groin (8%). A substantial portion of the game is played at top speed, with accelerations, decelerations, leaping, cutting, pivoting, turning, and ball kicking among the functional activities. According to research, the lower extremities account for 68 % to 88% of all football injuries.<sup>[6]</sup>

Hamstring flexibility is one of the predisposing factors for this muscle group's damage. Muscular flexibility is essential for optimal human function. Reduced flexibility has been found to increase the risk of musculoskeletal overuse injuries and has a substantial impact on a person's level of function. When running, the hamstring plays a key function in controlling stride length; if the stride length is longer, fewer contraction cycles are required to cover the same distance. This amounts to energy saving, allowing for higher and longer performance before tiredness, as well as a lower risk of injury.<sup>[6]</sup> Injuries in many sports have been linked to strength and flexibility imbalances. In Australian rules football players, pre-season hamstring muscle weakening has been found as a risk factor for hamstring muscle injuries.<sup>[7]</sup>

Agility refers to a player's ability to respond to a stimulus by performing fast whole-body motions with variations in pace or direction. A new definition of agility is proposed, which is described as a quick whole-body movement with a change in velocity or direction in response to a stimulus. Agility is linked to trainable physical traits like strength, power, and skill, as well as cognitive components like visual scanning methods, quickness, and anticipation. A mix of speed, balance, power, and co-ordination is required for good agility. Regular progressive exercise can help you enhance your agility, which is a motor skill. Football players will be able to move quicker and change directions more rapidly while retaining control if they focus on agility and improve their balance and co-ordination. According to Goral K et al., some characteristics of a football player that make him a better player include the ability to change direction rapidly, accelerate swiftly across 10-15 meters, have quick feet or agility, be quick in control of the ball and execute abilities quickly.<sup>[8]</sup>

Therefore, it is necessary to find the association of flexibility and agility to the prevalence of hip and groin injuries in order to improve the football players game-play, performance and reduce risk of injuries.

## II. METHODOLOGY AND MATERIALS

### 2.1 Methods

- Study design: Survey based
- Study duration: 6 months
- Sample Size: 100
- Study set up: Sports grounds in and around Pune
- Target Population: Football players

### 2.2 Materials

Constant: Pen, Data collection sheets, sit and reach box, tape, Cones, Timer, marker/chalk

### 2.3 Inclusion Criteria

- Football players willing to participate
- Player's aged between 11-30 years
- Male
- Having a hip and groin injury
- Having hip and groin pain

### 2.4 Exclusive Criteria

- Football players having any other injuries
- Players playing any other sports that football
- Football players who haven't played recently

### 2.5 Outcome Measures

1. The Hip and Groin Outcome Score (HAGOS) (ICC 0.82 – 0.91)
2. Hamstring flexibility using Sit and reach test (SRT) (ICC 0.96 < 0.99)
3. Agility using Illinois Agility Test (IAT) (ICC 0.99)

### Procedure

Permission and ethical clearance of the study was taken from the institutional committee of Tilak Maharashtra Vidyapeeth, Department of Physiotherapy, Pune. Different football clubs were approached and the ones willing to participate in this study were selected. The aims and objectives of the study were explained to the football players. The player was also explained the procedure of the study and the tests included that were hip and/or groin outcome score questionnaire, the sit and reach test and the Illinois agility test. The Consent of the willing football players was taken, a pilot study of 30 players was taken and after errors were resolved, the study was done on the remaining 70 football players. After all the test were conducted the data was analyzed.

**III. RESULTS****RESULT NO 1: AGE OF FOOTBALL PLAYERS (years)**

AGE (in years)	NO. OF FOOTBALLERS	PERCENTAGE
11-15	30	30%
16-20	58	58%
21-25	10	10%
26-30	2	2%
TOTAL	100	100%

**RESULT NO 2: HOURS OF PRACTICE (per week)**

HOURS OF PRACTICE (per week)	NO. OF FOOTBALLERS	PERCENTAGE
1-5	61	61%
6-10	37	37%
11-15	1	1%
16-20	1	1%
TOTAL	100	100%

**RESULT NO 3: BMI OF FOOTBALL PLAYERS**

BMI	NO. OF FOOTBALLERS	PERCENTAGE
UNDERWEIGHT	7	7%
NORMAL	85	85%
OVERWEIGHT	8	8%
TOTAL	100	100%

**RESULT NO 4: DISTRIBUTION OF HIP AND GROIN INJURY IN ACCORDANCE DIMENSIONS OF HAGOS**

Subtypes	Mean Score $\pm$ SD
Symptoms and Stiffness	78.99 $\pm$ 13.25
Pain	88.42 $\pm$ 10.62
Physical functions, Daily living	83.7 $\pm$ 14.6
Function, Sports and Recreational Activities	81.61 $\pm$ 12.97
Participation in Physical activity	80.22 $\pm$ 16.17
Quality of life	86.85 $\pm$ 12.66

**RESULT NO 5: ASSOCIATION OF HIP AND GROIN INJURY IN ACCORDANCE TO SRT AND HAGOS.**

	MEAN	SD	
SRT	28.98	11.42	<b>r- value- 0.2728</b>
HAGOS	83.35	9.09	<b>p-value- &lt;0.0001</b>

Interpretation: The above table shows that, the mean score of Sit and Reach test which is 28.98 done to assess the flexibility of the football player along with the mean score of HAGOS questionnaire which is 83.35 done to assess the extent of injury. r-value is 0.2728 and p-value is <0.0001, which is extremely significant

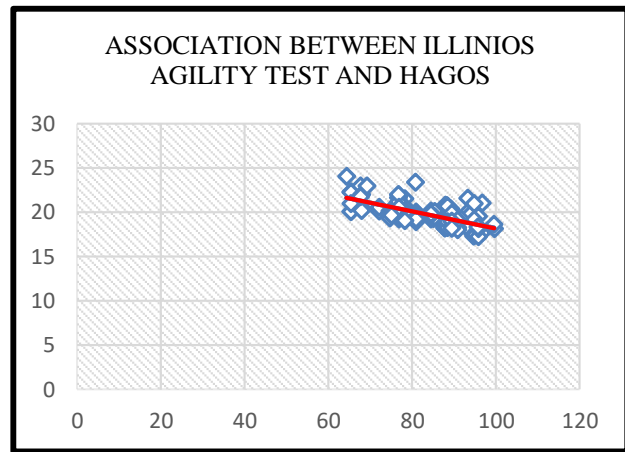
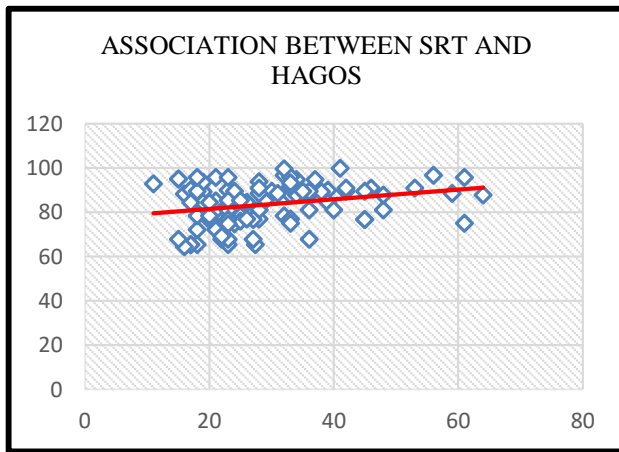
**RESULT NO 6: ASSOCIATION OF HIP AND GROIN INJURY IN ACCORDANCE TO ILLINIOS AGILITY TEST AND HAGOS.**

	MEAN	SD	
IAT	19.77	1.32	<b>r- value- -0.6572</b>
HAGOS	83.35	9.09	<b>p- value- &lt;0.0001</b>

Interpretation: The above table shows that, the mean score of Illinois Agility test which is 19.77 done to assess the agility of the football player along with the mean score of HAGOS questionnaire which is 83.35 done to assess the extent of injury. r-value is -0.6572 and p-value is <0.0001, which is extremely significant.

Graph No 1: Association between SRT and HAGOS

Graph No 2: Association between IAT and HAGOS



#### IV. DISCUSSION

The aim of this study is to find the prevalence of hip and groin injuries in individuals who are football players. The objectives of this study were to find the prevalence of hip and groin injuries based on the factors associated with the risk of injury that is age, BMI, hours of practice, flexibility and agility of the players.

Result No 1 shows the age-wise distribution of the football players, out of 100 football players that were included in this study aged between 11-30 years, 30 players were between the age group 11 to 15 years of age, 58 players were between the age group 16 to 20 years of age, 10 players were between the age group 21 to 25 years of age and 2 players between 26 to 30 years of age. The average age of football players in this study was 17.22 and standard deviation was 3.19.

Result No 2 shows the hours of practice done by the players per week. From a total of 100 players, 61 players practiced for 1 to 5 hours per week, 37 players practiced for 6 to 10 hours per week, 1 player practiced for 11 to 15 hours per week and 1 player practiced 16 to 20 hours per week. The average practice time was 5.2 hours per week with a standard deviation of 2.71.

Result No 3 shows the BMI of the football players, from 100 players, 7 players were underweight, 85 players were having normal BMI and 8 players were overweight. The average BMI of football players was 21.18 with a standard deviation of 2.18.

Result No 4 shows that in this study the affection of hip and groin injuries that were assessed using the HAGOS questionnaire. Its cumulative score had the mean of 83.35 with standard deviation of 9.09 and its individual dimensions found that 'Symptoms and Stiffness' was affected the most with a mean score of 78.99 followed by 'Physical activity' with a mean score of 80.22. 'Sports and recreation' were moderately affected with a mean score of 81.61. 'Physical function' had a mean score of 83.7, 'Quality of life' had a mean score of 86.85 and 'Pain' had a mean score of 88.42. A greater affection of 'Symptoms and Stiffness' was noted, followed by 'Physical activity' and 'Sports and recreation' probably as the hip joint is one of the most required joints in any physical activity or sports. Also, any change in a person's speed or direction is quickly noticed and has a significant impact on them. According to Thorborg K, et al., the football players who have suffered hip and/or groin pain in the previous season have lower HAGOS subscales than those who have not. In hip and groin injury-free soccer players, median HAGOS subscale scores are close to the maximum (100 points), and scores of 64–80 constitute the lower limit for the six-subscale 95 percent reference range in soccer players.<sup>[9]</sup>

Graph No 1 shows the association between HAGOS and the flexibility. This was done with the HAGOS questionnaire and the Sit and Reach box. The association for Sit and Reach test and HAGOS score of each individual football player was found to have the p-value is <math><0.0001</math> which was extremely significant. The mean 28.98 and standard deviation of 11.42 was noted for the Sit and Reach test while the mean of 83.35 and standard deviation of 9.09 was noted for the Hip and/or Groin Outcome Score Questionnaire. According to Tyler et al. injuries in many sports have been linked to strength and flexibility imbalances. In Australian rules football players, pre-season hamstring muscle weakening has been found as a risk factor for hamstring muscle injuries.<sup>[7]</sup> Based on another study done by Fayaz R. K. et al. one of the predisposing factors for the hip and groin muscle group's damage is the flexibility of hamstring muscle. As described by N Bhosale et al., as the tension-

length slope grows steeper causing greater tensions with small deformations, stiffness in the hamstring muscle increases making it more prone to injuries. <sup>[10]</sup> According to Adkitt et al., if the hamstring muscles flexibility is reduced it is a cause for hamstring muscle injuries therefore preventive programs are advised <sup>[11]</sup>, for optimal human functioning muscular flexibility is of utmost priority. If there is reduced flexibility it was found to have an increased risk of musculoskeletal overuse injuries and also substantial impact on a player's level of function. Hamstring muscle plays the key function in running as it controls the stride length as if the stride length is longer only a few contraction cycles are used to cover the similar distance, this results in energy saving, allowing for higher and longer performance before getting fatigued as well as a lower risk of injury. <sup>[6]</sup> Therefore, Hip and Groin injuries have a direct association with the flexibility of the football players and concentrating on managing these injuries occurring due to the reduced flexibility of hamstring muscle should be done.

Graph No 2 shows the association between HAGOS and the agility. This was done with the HAGOS questionnaire and the Illinois Agility test. The association for the Illinois Agility test and HAGOS score of each individual football player was found to have the p-value is  $<0.0001$  which was extremely significant. The mean value for Illinois Agility test was 19.77 with a standard deviation of 1.32 while the mean of 83.35 and standard deviation of 9.09 was noted for the Hip and/or Groin Outcome Score Questionnaire. As described by U.L. Yeole et al., factors that affecting the players agility are the foot placement, body inclination, postural adjustments and adjustments to acceleration of steps <sup>[12]</sup> which should be taken in consideration while training the players for agility. According to Hachana et al. agility, a prominent term used by strength and conditioning practitioners, is typically regarded the basic factor in many sports and activities. During a football game, a football player changes direction every 2–4 seconds and makes 1,200–1,400 changes of direction. Therefore, enhancing the ability to alter direction Football players' agility has become a focal point of training programs, and as a result, numerous research has been undertaken to improve and analyze this athletic characteristic. <sup>[13]</sup> Therefore, good agility is a requirement for an optimal performance of football players. The hip and groin muscles strength have to be good in order for the agility of the player to have a good agility. If the agility of the player is less the chances of injury in these players is greater as football requires rapid change in directions, twisting or pivoting on the leg which is majorly supported by the hip and groin muscles.

In this study, all of the willing football players were taken across Pune. The average the mean of 83.35 and standard deviation of 9.09 was noted for the Hip and/or Groin Outcome Score Questionnaire. Association of the Sit and Reach test was done to assess the flexibility of the football player along with the HAGOS questionnaire done to assess the extent of injury was found to have positive co-relation with r-value of 0.2728 and p-value is  $<0.0001$ , which is extremely significant. Association of the Illinois agility test was done to assess the agility of the football player along with the HAGOS questionnaire done to assess the extent of injury was found to have a negative co-relation with r-value of -0.6572 and p-value is  $<0.0001$ , which is extremely significant.

The result of the study reported that there is prevalence of hip and groin injuries in football players. Along with a positive correlation between the flexibility to prevalence of hip and groin injuries, this means that the flexibility of the player has a direct impact over the extent of hip and groin injuries the football player is predisposed to. A negative correlation was found between agility to the prevalence of hip and groin injuries which tells us that with good agility the risk of hip and groin injuries is potentially reduced.

## V. CONCLUSION

This study concludes that there is prevalence of hip and groin injury in football players. A significant association was found between flexibility and agility of the player to hip and groin injuries.

## VI. LIMITATION AND FUTURE SCOPE OF STUDY

### 6.1 Limitations:

Recreational football players were not included and targeted age group was 11–30 only. Co-relation between age, years of playing, time off field was not done also only male football players were included.

### 6.2 Future Scope:

A similar study can be done with recreational football players and female football players.

## VII. ACKNOWLEDGEMENT

Sincere gratitude to the football players who participated in the study and the Department of Physiotherapy, Tilak Maharashtra Vidyapeeth, Pune for granting us permission to carry forward our study.

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